



DOCUMENT CHANGE REQUEST

| | | | | | |
|------------|-------------|-----------------------|------------|---------------|--------------|
| DCR number | 187 | Changes required for: | N/A | Originator: | Sylvie Peron |
| Date: | 2005/06/28 | Date sent: | 2005/06/28 | Organisation: | ESA/ESTEC |
| Status: | IMPLEMENTED | | | | |

Title: Transistors Low Power NPN, based on type 2N2484

Number: 5201/001 Issue: 2

Other documents affected:

5201/002-1, 5201/003-1, 5201/004-1, 5201/006-1, 5201/011-1, 5201/019-2, 5202/001-1, 5202/002-1, 5202/008-1, 5202/014-1, 5203/004-1, 5203/010-2, 5203/011-1, 5203/016-1, 5204/002-2, 5204/006-1, 5207/002-1, 5207/003-1, 5207/005-1

Page:

Appendix A for STM

Paragraph:

Appendix A for STM

Original wording:

Proposed wording:

Together with DCR154 item 18 proposing an amendment to Appendix A for STM, this DCR proposes to add a note to Appendix A for STM that High and Low Temperatures Electrical Measurements during screening may be considered guaranteed but not tested based on successful wafer level pilot lot testing.

Note to Appendix A to be as follows:

.....

Item Affected
Deviations from High and Low Temperatures Electrical Measurements

Description of Deviations

All characteristics specified may be considered guaranteed but not tested if successful pilot lot testing has been performed on the wafer lot which includes characteristic measurements at high and low temperatures per the Detail Specification. A summary of the pilot lot testing shall be provided if required by the Purchase Order.

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Justification:

To incorporate specific deviations requested by manufacturer STM within appendix A which are considered technically acceptable based on the ESCC approved PID for this and other ESCC qualified components manufactured by STM and the following information provided by STM:

STM has performed an analysis/correlation between internal pilot lots testing (3 pilot lots taken from different diffusion lot



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and diffusion run) and Customer lots delivered using same wafer/diffusion lot - see attached relevant reports (rapport / annex1 / annex2).

This analysis shows that the measurements done as part of pilot lot are representative of the measurements done on Customer lots, without any significative drift.

Attachments:

annex1.PDF, rapport.pdf, annex2.PDF, DCR_Attachment_STM_parts.pdf, null

Modifications:

N/A

Approval signature:

Date signed:

2005-06-28

Annex 2

2N2907 PNP

| TEST | 5 | 12 | 13 | 14 | 15 | | |
|--|-------------------------------------|---------------------------------------|---|--|---|----------|-----------|
| CHARACTERISTICS | Collector-Base Cut-off Current | A.C Forward Current Transfer Ratio | Output capacitance | Turn-on Time | Turn-off Time | | |
| MIL-STD-750 TEST METHOD | 3036 | 3206 | 3236 | | | | |
| SYMBOL | Icbo | Hfe | Cobo | Ton | Toff | | |
| TEST CONDITIONS | Tam= +150c° Vcb= - 50V Ic=0mA | Ic= - 50mA Vce= - 20V F=100MHz | Vcb= - 10v Ie=0A 100 KHz< f < 1 MHz | Vcc= - 30v Ic= - 150mA Ib1= - 15mA | Vcc= - 30v Ic= - 150mA Ib1=Ib2= -15mA | | |
| LIMITS | < 10µA | > 2.0 | < 8.0 pF | < 45 ns | < 300 ns | | |
| | Na | - | Pf | ns | ns | | |
| 576 analyses parts (50 analyses parts / pilote lot) | 4.9440.002 W206144 LP640 | MIN | 10 (29)* | 2.4 (2.6) | 5.4 (5.6) | 17 (18) | 252 (264) |
| | | MOY | 36 (36) | 2.8 (2.7) | 5.7 (5.6) | 20 (19) | 271 (273) |
| | | MAX | 84 (42) | 3.4 (2.9) | 5.9 (5.7) | 24 (20) | 291 (290) |
| 596 analyses parts (50 analyses parts / pilote lot) | 4.9648.001 W214705 LP719 | MIN | 15 (23) | 2.5 (2.5) | 4.8 (5.6) | 18 (18) | 220 (221) |
| | | MOY | 31 (29) | 2.6 (2.6) | 5.4 (5.7) | 21(20) | 241 (240) |
| | | MAX | 54 (38) | 2.9 (2.7) | 6.1 (5.9) | 24 (20) | 264 (256) |
| 256 analyses parts (50 analyses parts / pilote lot) | 4.9724.007 W216461 LP724 | MIN | 14 (23) | 2.5 (2.5) | 4.9 (5.6) | 19 (19) | 224 (226) |
| | | MOY | 29 (34) | 2.6 (2.6) | 5.4 (5.7) | 21 (20) | 242 (242) |
| | | MAX | 51 (42) | 2.8 (2.9) | 5.9 (5.9) | 24 (21) | 254 (263) |

2N2222 NPN

| TEST | 4 | 9 | 12 | 13 | 14 | 15 | | |
|--|-----------------------------------|---|---------------------------------------|--|---------------------------------|-------------------------------------|---------|-----------|
| CHARACTERISTICS | Collector-Base Cut-off Current | D.C Forward Current Transfer Ratio 2 | A.C Forward Current Transfer Ratio | Output capacitance | Turn-on Time | Turn-off Time | | |
| MIL-STD-750 TEST METHOD | 3036 | 3076 | 3206 | 3236 | 3251 Cond B | 3251 Cond B | | |
| SYMBOL | Icbo | Hfe2 | Hfe | Cobo | Ton | Toff | | |
| TEST CONDITIONS | Tam= +150c° Vcb=60v | Tam= - 55c° Ic =10 mA Vce = 10V | Ic=20mA Vce=20V F=100MHz | Tam= +25°c Vcb=10v Ie=0A 100 KHz< f < 1 MHz | Vcc=30v Ic=150mA Ib1=15mA | Vcc=30v Ic=150mA Ib1=Ib2=15mA | | |
| LIMITS | < 10µA | > 35 | 3.0 < x < 10 | < 8.0 pF | < 35 ns | < 285 ns | | |
| | Na | - | - | - | ns | ns | | |
| 732 analyses parts (50 analyses parts / pilote lot) | 4.9614.001 W210874 LP653 | MIN | 3 (20) | 91 (93) | 3.1 (3,1) | 3.3 (3.7) | 17 (19) | 200 (198) |
| | | MOY | 25 (25) | 113 (109) | 3.4 (3,3) | 3.9 (3.8) | 21 (19) | 217 (217) |
| | | MAX | 61 (32) | 151 (121) | 3.9 (3,4) | 4.0 (3.9) | 26 (20) | 239 (236) |
| 704 analyses parts (50 analyses parts / pilote lot) | 4.9723.001 W216348 LP704 | MIN | 5 (15) | 81 (77) | 3,1 (3,4) | 3,4 (3.9) | 16 (18) | 198 (217) |
| | | MOY | 19 (22) | 130 (119) | 3.2 (3,6) | 3.7 (4.0) | 19 (19) | 228 (228) |
| | | MAX | 51 (28) | 166 (145) | 3.6 (3,8) | 4.4 (4.1) | 23 (19) | 258 (244) |
| 420 analyses parts (50 analyses parts for pilote lot) | 4.9649.001 W215454 LP861 | MIN | 11 (22) | 99 (88) | 3,1 (3,3) | 3.2 (4.1) | 17 (17) | 224 (250) |
| | | MOY | 21 (27) | 117 (113) | 3.2 (3,5) | 3.7 (4.2) | 18 (18) | 245 (258) |
| | | MAX | 34 (30) | 136 (130) | 3.6 (3,7) | 4.3 (4.3) | 22 (18) | 262 (270) |

* () pilote lot

DISCRETS

| Type | Detail specification number | Previous ESA/SCC reference | | | Actual ESCC reference | | | DC R | Marking | Package | Lead |
|----------|-----------------------------|----------------------------|-----|--------|-----------------------|-----|--------|------|--|--|--|
| | | Issue | Rev | Date | Issue | Rev | Date | | | | |
| 2N 2219A | 5201/003 | 5 | C | AUG 96 | 1 | | OCT 02 | | 5201003 01B ou 01C 5201003 02B ou 02C | TO39 TO39 | DORE D2 ETAME D3/D4 |
| 2N 2222A | 5201/002 | 4 | C | JAN 01 | 1 | | OCT 02 | | 5201002 01B ou 01C 5201002 02B ou 02C 5201002 04B ou 04C 5201002 05B ou 05C 5201002 06B ou 06C 5201002 07B ou 07C 5201002 09B ou 09C 5201002 10B ou 10C | TO18 TO18 LCC3 LCC3 TO18 TO18 LCC3 LCC3 | DORE D2 ETAME D3/D4 SOC DORE SOC ETAME DORE D2 ETAME D3/D4 SOC DORE SOC ETAME |
| 2N 2369A | 5201/006 | 3 | B | JUN 99 | 1 | | OCT 02 | | 5201006 01B ou 01C 5201006 02B ou 02C 5201006 04B ou 04C 5201006 05B ou 05C | TO18 TO18 LCC3 LCC3 | DORE D2 ETAME D3/D4 SOC DORE SOC ETAME |
| 2N 2484 | 5201/001 | 5 | B | JUN 99 | 2 | | JAN 04 | | 5201001 01B ou 01C 5201001 02B ou 02C 5201001 04B ou 04C 5201001 05B ou 05C | TO18 TO18 LCC3 LCC3 | DORE D2 ETAME D3/D4 SOC DORE SOC ETAME |
| | | | | | | | | | | | |
| 2N 2894 | 5202/004 | 3 | B | JUN 99 | 1 | | OCT 02 | | 5202004 01B ou 01C 5202004 03B ou 03C 5202004 06B ou 06C 5202004 07B ou 07C | TO18 TO18 LCC3 LCC3 | DORE D2 ETAME D3/D4 SOC DORE SOC ETAME |
| 2N 2905A | 5202/002 | 5 | D | AUG 96 | 1 | | OCT 02 | | 5202002 01B ou 01C 5202002 02B ou 02C | TO39 TO39 | DORE D2 ETAME D3/D4 |
| 2N 2907A | 5202/001 | 6 | C | JUN 99 | 1 | | OCT 02 | | 5202001 01B ou 01C 5202001 02B ou 02C 5202001 04B ou 04C 5202001 05B ou 05C | TO18 TO18 LCC3 LCC3 | DORE D2 ETAME D3/D4 SOC DORE SOC ETAME |

| Type | Detail specification number | Previous ESA/SCC reference | | | Actual ESCC reference | | | DC R | Marking | Package | Lead |
|---|-----------------------------|----------------------------|-----|--------|-----------------------|-----|--------|--|--|---|------|
| | | Issue | Rev | Date | Issue | Rev | Date | | | | |
| 2N 2919 2N 2919 2N 2919 2N 2919 2N 2920 2N 2920 2N 2920 2N 2920 2N 2920 2N 2920A 2N 2920A 2N 2920A 2N 2920A | 5207/002 | 6 | C | FEB 00 | 1 | | OCT 02 | 5207002 04B ou 04C 5207002 07B ou 07C 5207002 10B ou 10C 5207002 13B ou 13C 5207002 05B ou 05C 5207002 08B ou 08C 5207002 11B ou 11C 5207002 14B ou 14C 5207002 06B ou 06C 5207002 09B ou 09C 5207002 12B ou 12C 5207002 15B ou 15C | TO77 TO77 LCC6 LCC6 TO77 TO77 LCC6 LCC6 TO77 TO77 LCC6 LCC6 | ETAME D3/D4 DORE D7 LCC6 DORE LCC6 ETAME ETAME D3/D4 DORE D7 LCC6 DORE LCC6 ETAME ETAME D3/D4 DORE D7 LCC6 DORE LCC6 ETAME | |
| 2N 3019 | 5201/011 | 2 | | FEB 01 | 1 | | OCT 02 | 5201011 03B ou 03C 5201011 04B ou 04 C | TO39 TO39 | DORE D2 ETAME D3/D4 | |
| 2N 3350 | 5207/003 | 3 | C | FEB 00 | 1 | | OCT 02 | 5207003 02B ou 02C 5207003 03B ou 03C 5207003 04B ou 04C 5207003 05B ou 05C | TO77 TO77 LCC6 LCC6 | ETAME D3/D4 DORE D7 LCC6 DORE LCC6 ETAME | |
| 2N 3439 2N 3439 2N 3439 2N 3440 2N 3440 2N3440 | 5203/011 | 4 | | AUG 96 | 1 | | OCT 02 | 5203011 04B ou 04C 5203011 02B ou 02C 5203011 08B ou 08C 5203011 06B ou 06C | TO39 TO39 TO39 TO39 | ETAME D3/D4 DORE D2 ETAME D3/D4 DORE D2 | |
| 2N 3700 | 5201/004 | 5 | | OCT 99 | 1 | | OCT 02 | 5201004 01B ou 01C 5201004 02B ou 02C 5201004 04B ou 04C 5201004 05B ou 05C | TO18 TO18 LCC3 LCC3 | DORE D2 ETAME D3/D4 SOC DORE SOC ETAME | |
| 2N 3810 | 5207/005 | 6 | B | NOV 99 | 1 | | OCT 02 | 5207005 02B ou 02C 5207005 05B ou 05C 5207005 07B ou 07C 5207005 09B ou 09C | TO78 TO78 LCC6 LCC6 | ETAME D3/D4 DORE D7 LCCC6 DORE LCCC6 ETAME | |

| Type | Detail specification number | Previous ESA/SCC reference | | | Actual ESCC reference | | | D C R | Marking | Package | Lead |
|--------|-----------------------------|----------------------------|-----|--------|-----------------------|-----|--------|--|--|---|------|
| | | Issue | Rev | Date | Issue | Rev | Date | | | | |
| | | | | | | | | | | | |
| BUX 77 | 5203/016 | 4 | | JAN 98 | 1 | | OCT 02 | 5203016 03B ou 03C 5203016 04B ou 04C 5203016 05B ou 05C 5203016 06B ou C+BeO 5203016 07B ou C+BeO | TO66 TO66 TO66 TO257 TO257 | NICK/ETAM F9 DORE F2 ETAME F3/F4 DORE H2 ETAME H4 | |
| BUX 78 | 5204/006 | 4 | | JAN 98 | 1 | | OCT 02 | 5204006 03B ou 03C 5204006 04B ou 04C 5204006 05B ou 05C 5204006 06B ou C+BeO 5204006 07B ou C+BeO | TO66 TO66 TO66 TO257 TO257 | NICK/ETAM F9 DORE F2 ETAME F3/F4 DORE H2 ETAME H4 | |

Sujet : Suppression de la table 2 a.c (electrical measurements at room température ac parameters) et table 3 (électrical measurement a high and low temperatures)

Notre analyse porte sur deux transistors représentatifs de notre famille de produit : le 2N2222A de type npn et le 2N2907A de type pnp.

Une analyse a été faite sur 3 lots pilotes par type de transistors provenant : de lot de diffusion différent
:de serie de diffusion different

Annexe1

| <u>2N2222A</u> | | 50 pieces/ lp (soit 150 pieces) | | |
|-----------------------|---------------------|---------------------------------|---------------|--------------------------|
| N° LP | N° LOT DE DIFFUSION | N° WAFER | N° de PSL | Qte de pieces assemblées |
| 653 | 4.9614.001 | 210874 | 10512 à 12529 | 11953 |
| 704 | 4.9721.001 | 216348 | 13593 à 14345 | 15025 |
| 861 | 4.9649.001 | 215454 | 12960 à 15003 | 8543 |
| <u>2N2907A</u> | | 50 pieces/ lp (soit 150 pieces) | | |
| N° LP | N° LOT DE DIFFUSION | N° WAFER | N° de PSL | Qte de pieces assemblées |
| 640 | 4.9440.002 | 206144 | 10374 à 10400 | 10380 |
| 719 | 4.9648.001 | 214705 | 15066 à 14564 | 9887 |
| 724 | 4.9724.007 | 216461 | 13132 à 14599 | 7539 |

Une analyse a également été faite sur les mesures effectuées des lots clients issus de ces wafers de ces mêmes lots de diffusion et comparé aux résultats des lots pilotes(annexe 2)

annexe 2

*le tableau résume les tests conformes à la spec de détail ESCC
Les valeurs entre parenthese sont celles des lots pilotes*

Conclusion :

Les résultats nous montrent que les mesures effectuées sur les lots pilotes sont représentatives des mesures effectuées sur les lots clients et qu'il n'y a aucune dérive significative.

De ce faite ST propose de supprimer les Read and Record Table 2 AC et Table 3 high and low température, et de spécifier que ces paramètres sont déjà mesurés au cours du lot de qualification de chaque wafer. Ceci fera l'objet d'un appendice commun dans chaque spécification de détail. Voir proposition de la DCR jointe.

Annex 1

TYPE

| | 2N2222A | | | 2N2907A | | |
|---------------|------------|------------|------------|------------|------------|------------|
| | NPN | | | PNP | | |
| LOT DIFFUSION | 4.9614.001 | 4.9723.001 | 4.9649.001 | 4.9440.002 | 4.9648.001 | 4.9724.007 |
| RUN DIFFUSION | 04C96 | 02E97 | 03M96 | 01M94 | 02G96 | 02E97 |
| WAFER NUMBER | 210874 | 216348 | 215454 | 206144 | 214705 | 216461 |
| YEAR | 1997 | 1997 | 1999 | 1996 | 1997 | 1997 |
| N° PILOTE LOT | 653 | 704 | 861 | 640 | 719 | 724 |
| Qty | 50 parts | 50 parts | 50 parts | 50 parts | 50 parts | 50 parts |
| PSL | 10521 | 13593 | 12960 | 10374 | 15066 | 13132 |
| date code | 9729 | 0129A | 0021A | 9722 | 0431A | 0041A |
| QTE | 713 | 1000 | 660 | 1777 | 101 | 1481 |
| PSL | 10523 | 13634 | 13361 | 10425 | 13392 | 13160 |
| date code | 9726A | 0129B | 0107A | 9730 | 0107A | 0048A |
| QTE | 911 | 351 | 1495 | 500 | 1498 | 1045 |
| PSL | 10524 | 13852 | 13382 | 10504 | 13421 | 13170 |
| date code | 9728 | 0130A | 0109B | 9729 | 0110A | 0047A |
| QTE | 1371 | 1060 | 1373 | 405 | 1389 | 1067 |
| PSL | 10526 | 13702 | 14078 | 10522 | 13728 | 13211 |
| date code | 9726 | 0135A | 0215A | 9731 | 0137A | 0049A |
| QTE | 255 | 940 | 1008 | 618 | 74 | 807 |
| PSL | 10565 | 13704 | 13686 | 10802 | 13422 | 14531 |
| date code | 9734B | 0136A | 0129A | 9738 | 0110B | 0319A |
| QTE | 248 | 55 | 18 | 113 | 5 | 802 |
| PSL | 10568 | 13715 | 14109 | 10566 | 13683 | 14543 |
| date code | 9732 | 0134A | 0224A | 9734 | 0131A | 0321A |
| QTE | 762 | 1284 | 761 | 228 | 908 | 793 |
| PSL | 10569 | 13727 | 14117 | 10654 | 13908 | 1482 |
| date code | 9734 | 0137A | 0222A | 9734B | 0202A | 0324A |
| QTE | 561 | 74 | 531 | 208 | 630 | 791 |
| PSL | 10570 | 13747 | 14153 | 10356 | 13835 | 14599 |
| date code | 9734A | 0140A | 0219A | 9721 | 0146A | 0326A |
| QTE | 551 | 500 | 16 | 520 | 150 | 753 |
| PSL | 10593 | 13751 | 14225 | 10329 | 13844 | |
| date code | 9727 | 0142A | 0229A | 9720 | 0145A | |
| QTE | 102 | 1500 | 1005 | 300 | 150 | |
| PSL | 10653 | 13758 | 14243 | 10355 | 13744 | |
| date code | 9735 | 0141A | 0233A | 9720A | 0138A | |
| QTE | 228 | 1500 | 700 | 440 | 600 | |
| PSL | 10655 | 13812 | 14848 | 10317 | 14377 | |
| date code | 9732A | 0145A | 0414A | 9719 | 0248A | |
| QTE | 58 | 1567 | 50 | 548 | 50 | |
| PSL | 10657 | 13830 | 14901 | 10455 | 14415 | |
| date code | 9730 | 0145B | 0424A | 9721A | 0305A | |
| QTE | 530 | 933 | 140 | 1019 | 740 | |
| PSL | 10700 | 13833 | 14911 | 10466 | 14276 | |
| date code | 9739 | 0143A | 0407A | 9724 | 0235A | |
| QTE | 277 | 73 | 336 | 605 | 49 | |
| PSL | 10703 | 13850 | 15003 | 10401 | 14445 | |
| date code | 9741 | 0148A | 0431A | 9724 | 0311A | |
| QTE | 550 | 1000 | 446 | 619 | 1605 | |
| PSL | 10704 | 13892 | | 10475 | 14862 | |
| date code | 9741A | 0150A | | 9729 | 0335A | |
| QTE | 550 | 115 | | 540 | 296 | |
| PSL | 10785 | 13893 | | 10492 | 14507 | |
| date code | 9738 | 0150B | | 9724A | 0316A | |
| QTE | 1013 | 60 | | 902 | 159 | |
| PSL | 10803 | 13907 | | 10493 | 14504 | |
| date code | 9739 | 0203A | | 9724B | 0316A | |
| QTE | 473 | 763 | | 1023 | 50 | |
| PSL | 10804 | 13948 | | 10400 | 14544 | |
| date code | 9740 | 0203A | | 9725 | 0321A | |
| QTE | 626 | 50 | | 585 | 32 | |
| PSL | 10817 | 13958 | | | 14564 | |
| date code | 9741 | 0204A | | | 0326A | |
| QTE | 300 | 1000 | | | 261 | |
| PSL | 10818 | 14322 | | | | |
| date code | 9746 | 0242A | | | | |
| QTE | 1447 | 150 | | | | |
| PSL | 11101 | 14343 | | | | |
| date code | 9750 | 0243A | | | | |
| QTE | 138 | 50 | | | | |
| PSL | 11794 | 14345 | | | | |
| date code | 9841A | 0248A | | | | |
| QTE | 125 | 1000 | | | | |
| PSL | 11796 | | | | | |
| date code | 9843A | | | | | |
| QTE | 116 | | | | | |
| PSL | 12529 | | | | | |
| date code | 9926A | | | | | |
| QTE | 48 | | | | | |
| PSL | | | | | | |
| date code | | | | | | |
| QTE | | | | | | |
| PSL | | | | | | |
| date code | | | | | | |
| QTE | | | | | | |
| TOTAL | 11953 | 15025 | 8543 | 10380 | 9887 | 7539 |